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ABSTRACT

Laboratory and professional training activities among instructional units at the Universite de Montreal were evaluated with respect to the prominence of such activities in degree programs, the amount of work required of students, the involvement of the various teaching and supervisory personnel, and the costs. The organization of laboratory and field work activities was also assessed, including student supervision and section size, time allocation of teaching personnel, and the cost of staff and activities. Findings include the following: large gaps were found among units with respect to costs of these activities; cost variations among departments depended on such factors as the structure of activities, the intensity of supervision, and the category of teaching personnel responsible for the activities; and there were no common patterns of organization, which on the basis of disciplinary lines could be used to predict costs of activities. Information is presented on: the relative importance of laboratory and clinical/internship activities within curricula and the contribution to student credit hours of laboratory and clinical/internship activities. (SW)

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ASSESSMENT OF LABORATORY AND FIELD WORK ACTIVITIES

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THE ASSOCIATION FOR INSTITUTIONAL RESEARCH

This paper was presented at the Twenty-Third Annual Forum of the Association for Institutional Research held at the Sheraton Centre in Toronto, Ontario, May 23-26, 1983. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum papers.

D. R. Coleman, Chairman
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ASSESSMENT OF LABORATORY AND FIELD WORK ACTIVITIES

This study is an attempt to isolate and measure a number of variables as they relate to laboratory and professional training activities of university students. The main variables refer to the prominence of such activities in degree programs, the amount of work required of students, the involvement of the various teaching and supervisory personnel, and the cost figures tagged to those activities.

Balance between theory and practice in academic curricula has long been a subject of open debate. Students are interested in experiencing the relevance of classroom learning for concrete situations; faculty members raise issues of academic respectability; college officials worry about not losing control over cost; and while community service agencies are willing to fulfill their social responsibility, they also want to derive some manpower benefits from having students. Despite this accepted ambiguity over activities not conducted in a traditional classroom setting, the current trend seems to call for even more learning-by-doing opportunities.

The Case for Applied Learning

Methods used to provide students with practical training in their academic preparation vary with the nature of disciplines and fields. Chemistry and anatomy, for example, are laboratory disciplines; therefore, students spend a considerable portion of their training experimenting with liquids and gasses, examining skeletons, and dissecting bodies. Law uses a combination of on-campus case studies and off-campus internships. Education has practicum programs to sharpen future teachers' skills.

The literature is full of examples describing how experiential learning is being seen and implemented. Pharmacy schools require that their students spend more time in actual practice settings and be able to accomplish predetermined tasks such as distribution of drugs and other heatlh-care products, labeling, inventory maintenance and control, packaging and sales promotion and advertising (Hightomer & Yanchick, 1979). The Ryerson Polytechnical Institute in Toronto maintains that a three-month internship in a student's field of specialization is a necessary and important part of an applied curriculum (Foster, Jones & Mack, 1979). Such an internship allows concepts, theories, and skills to be tested in a real work situation rather than in a simulated environment of the classroom; it provides opportunities for the students and the community to mix and assist each other; and it also samples employment opportunities. A public service internship program at Baylor University is integrated in the undergraduate political science curriculum (Avant, 1981). Student participants work a minimum of 100 hours per semester at a public or nonprofit agency in a job with a substantial administration component. Most authors in the field of teacher education recognize the role of the practicum in bridging the gap between school and university (Hopkins, 1980; Holcomb, 1980) and are constantly exploring new ways to make these experiences more effective (Ratsoy, 1979; Wilgosh, Yewchuk & Blowers, 1980). Most of these studies are interesting and pose no threat to the common belief that field training constitutes an important transition between the academic setting and field practice.

Paucity of Analytical Studies

Although descriptive studies abound in experiential education, evaluative and analytical articles are not so plentiful. Satariano and Rogers (1979) published

the results of a survey of undergraduate intern programs administered to departments of sociology in the United States. They found that practices differed dramatically in terms of amount of work, faculty supervision, evaluation, and role of field agencies. Typically, students received between three and four academic credits for a range of hours at the site running from two to forty hours a week; all students were generally expected to complete written work. They also observed that intern programs were administered much more informally than other parts of the undergraduate curriculum. In only half of the departments surveyed did faculty members receive some teaching load recognition. By most standards, evaluation criteria were at best diffuse and ambiguous. Other studies in fields such as law (Reed, 1980) and engineering (Pierce & Birmingham, 1981) describe how evaluation is conducted but do not go into the details which would potentially be helpful to departmental and central administrative decision making; they are mostly written for pedagogical purposes.

Among several studies dealing with the management of experiential learning programs, two articles deserve special mention. Stone (1982) offers suggestions for setting up such programs on and off campus, including a system for awarding credit, community placements, faculty supervision, and coordination. Laurentz (1979) explains in fair detail the kind of coordination necessary to make these activities successful. The author raises broad issues of staffing and financing policies and procedures that must be clarified at the academic unit and central administration levels prior to initiation of such program components.

Setting up the Survey

Following a thorough examination of teaching activities for the specific purpose of making budget cutbacks, the Université de Montréal felt that special

attention should be paid to laboratory activities and activities not conducted within the structured and controlled classroom learning environment. The primary objective was to collect the facts, identify problem cases, and take corrective measures, if necessary.

In the spring of 1982, an advisory committee was formed and charged to look into the problem with the assistance of the Office of Institutional Research. Two basic decisions had to be made before any methodological approaches could be applied. The first was to extend the study to include laboratory activities in addition to field work experiences. The second was to come to an agreement on whether the methodology should establish institutional norms or whether it should provide general guidelines and definitions for the requested data; the latter alternative was judged more desirable on many accounts, despite a lack of concensus within the committee.

Two different questionnaires were developed to gather factual information on all activities falling under the broad umbrella of laboratory and field experience. Each of the respective questionnaires was structured along course lines, and aimed at assembling data on student course requirements and workload on the one hand, and faculty and supervisory personnel involvement and credit assignment on the other. The first version of these two questionnaires was tried on two academic units known to have a combination of laboratory and internship programs before launching the complete operation with the 35 identified units. Following this two-unit trial, a few modifications were made to the questionnaires and all units concerned were asked to participate in the survey. Given the difficult nature of such a study dealing with sometimes elusive facts, personal contacts were established at once with all units to make sure they would pay appropriate attention to the survey and to offer technical assistance if needed.

Analytical Matrix

The data elements contained in the questionnaires were designed to gather a wealth of information that was thoroughly sifted, cross-checked for accuracy, validated, and tabulated in an analytical matrix. Table 1 shows the four main categories of variables to be used in the analysis: student activities, personnel activities, contact ratios, and costs. An explanation and definition of each variable would be unnecessary at this stage since they are generally known realities in the field; additionally, they are sufficiently described and referred to in the analytical section. All concerned degree program levels were part of the survey; therefore, Table 1 presents data for undergraduate and graduate levels to exemplify the entire coverage of the study. However, this paper will focus exclusively in its analytical section on the undergraduate level due to space limitations.

Analysis of Teaching Activities

Results from the study allow us to analyse the extent of practical training across departments and teaching activities. Table 2 presents the percentage distribution of theoretical, laboratory and clinical/internship activities with respect to course credits taught and student credit hours generated.

Data on laboratory, clinical/internship activities can be used to describe professional programs as they rely heavily on applied training. In Table 3, one can identify the traditional highly professional programs such as dentistry, veterinary medecine and architecture. Some programs are more applied than expected; such is the case with educational psychology. Nursing, could also be expected to appear as a moderately professional degree since certified nurses in Quebec are

mostly trained at the college level, the university degree preparing students for specialization and the acquisition of more advanced knowledge. Higher ratios of applied activities might also have been expected in curricula of departments such as optometry, physics, psychology, law and communication sciences.

Figure 1 demonstrates the relative importance of laboratory and clinical/internship activities within curricula as well as the complementarities between the two teaching components. Families of units occupying a similar position on the graph can readily be identified. The health-related professions occupy a position where training is achieved through both laboratory and clinical/internship activities in relatively proportional parts. Architecture-related professions rely mostly on laboratory activities, whereas social work and health service administration train their professionals solely through clinical/internship programs. Proportions vary depending on the discipline. All laboratory sciences use laboratory teaching, but important variations among units occur because of particularities of programs and departments which present themselves as more or less applied. Decision makers may want to question the suitability of having a low or high proportion of applied training in a given program. It is ultimately a question which has to be debated within the framework of program design and development.

The contribution to student credit hours of laboratory and clinical/internship activities does not necessarily follow the course credit proportions of such activities. In physical education, for instance, 44% of course credits are applied but also entirely optional within the program; they generate only 29% of the department student credit hours. Alternatively, in educational psychology, 39% of all academic credits taught are applied but they produce

as much as 46% of all student credit hours of the department. Practical training is an integral part of every student's preparation in the latter unit as well as in others: this will be reflected in the overall cost for these activities as will be seen later in the study.

Finally, a comparison of student credit hours as indicators of unit size on the one hand, and levels of practical training on the other, shows that the four units with the highest ratio of laboratory and clinical/internship activities are among the smallest departments, with less than 5000 student credit hours. Alternatively, units expected to provide more practical training such as law and psychology are the largest units in size with more than 15 000 student credit hours. Unit size is shown in these cases to have relevance in explaining levels of activities of an applied nature.

Survey results were also very useful in providing extensive information regarding the organization of laboratory and field work activities especially in the areas of:

1) student supervision and section size
2) time allocation of teaching personnel
3) cost of staff and activities.

Student Supervision and Section Size

The typical laboratory activity is performed with an average class size of 17.3 students. Section size for each unit laboratory activities is shown in Table 4. For the 33 units surveyed, only 9 (27%) had section sizes of more than 24 or less than 10 students per section. The ratio of staff contact hours to

section hours provides a useful indication of the level of supervision received by a typical laboratory section in a given unit. Although the average for all units shows one hour of supervision for each section hour of activity (1.02), the ratio ranges from 0.15 or the equivalent of 9 minutes of supervision by all categories of personnel for laboratory sections in the department of anthropology, to 2,7 or 2 hours and 12 minutes of supervision for laboratory sections in criminology. Overall, 58% of all units between 45 minutes and an hour 15 minutes of supervision for each section hour. Of the remaining units (19), 21% provide less than 45 minutes of supervision per section hour (.75) and 21% provide more than one hour 15 minutes (1.25) (See Table 5).

Small section sizes are necessary for clinical and field work activities as exemplified by the average of 3.1 students per section. Section size for the programs surveyed range from 1.0 for the individually-supervised activities, such as in health service administration or industrial relations, to 8.2 and 9.0 for the group-supervised activities, such as in nursing and pharmacy respectively. The typical section hour of clinical or field work activity receives an average of 38 minutes of staff supervision (0.64). Values range from a low of 0.04 for industrial relations students (group size = 1) to a high of 1.92 (or almost 2 hours of direct supervision for each section hour) for occupational and physical therapy (group size = 1.8) (See table 6).

Teaching Personnel's Time Allocation

Academic units also provided information on staff time requirements of laboratory and clinical/internship activities with respect to contact hours and hours required for other activities such as preparation, evaluation and organization for different categories of personnel. Academic units seem to differ

significantly on their staff preferences for supervising laboratory activities and on time requirements for contact versus other academic activities (See Table 7).

On average, 46% of all laboratory contact hours are assumed by career-faculty members, 14% by part-time instructors and 40% by teaching assistants. Furthermore, contact activities generally account for 61% of staff time requirements for these activities. Table 8 shows the distribution of units according to the proportion of staff contact hours in relation to total staff hours. Programs (such as industrial relations, mathematics, and law) that have been categorized as least applied (see Table 3) share the same staff time allocation. Their activities other than contact take up a large share of staff time (more than 50% of all staff time). For these programs, laboratory activities seem to require more time in preparation, correction, and coordination, which explains why contact hours are usually less numerous than in most programs with laboratory activities. (See hours per credit in Table 4).

If we look more carefully at the role that teaching assistants have traditionally played in laboratories, one sees that in 42% of the units they account for more than 50% of all contact activities (see Table 9). Not surprisingly, they bear heavy teaching responsibilities not only in formal laboratory programs such as biology, chemistry, and physics but also in programs like computer science, geology, mathematics, educational psychology, and others. Units not relying much on auxiliary personnel but rather on career faculty members and part-time instructors are the architecture-related group, nursing, physical education, psychology, sociology, dentistry, and music. The question of whether or not teaching assistants possess the professional competency to teach laboratory activities in these particular units is being raised by the units involved.

Clinical/internship programs in turn, are mostly the responsibility of external supervisors who handle 57% of all contact hours, followed by career faculty members (24%), part-time instructors (11%), and teaching assistants (8%). Fifty three percent of all units use external supervisors for more than 75% of all contact hours; for the remaining units, career faculty members are closely involved with contact activities. This is particularly the case with nursing, pharmacy, anthropology and to a lesser extent, veterinary medecine. Dentistry and optometry rely heavily on part-time instructors recruited from private practice. Finally, contact hours for clinical/internship activities take on average 81% of the faculty work load. Since organization and coordination of these activities are time-consuming, relatively little staff time is spent in formal evaluation of the students' performance. (See Table 10).

Cost of Staff and Activities

Staff cost must be analysed independently of staff time allocation because of large gaps in remuneration levels occurring with different categories of personnel and because of under or non-remunerated hours of service, especially in clinical/internship activities (Table 11). In laboratory activities, career faculty members and part-time instructors assume 50% of all staff hours which account for 71% of all staff costs. The situation is more striking with clinical/internship activities where career faculty members and part-time instructors are responsible for 42% of all staff hours while their cost amounts to 81% of total cost.

The staff-related costs of laboratory, clinical/internship activities can be summarized through three cost-activity ratios which are detailed in Table 4:

1) cost per student credit hour

2) cost per section hour

3) cost per student hour.

The cost per student credit hour ratio reflects the official academic value of the laboratory or clinical/internship activities independently of the variable time requirements of credits and of the organization of activities in relation to section sizes. The cost per section hour ratio provides information on the actual contact activity with its particular staff utilization pattern and organization of teaching. This ratio best describes the cost of laboratory activities. The cost per student hour ratio reflects the overall cost of activities weighted for student participation.

Because of heterogeneity among units in structuring activities with respect to section sizes, staff utilization patterns, and contact hours, the relationship between units in the three cost distributions varies significantly, making comparisons between them very difficult.

For the purpose of this analysis, comments will focus primarily on the two cost per section hour distributions for laboratory and clinical/internship activities, making only references to the other distributions.

Average cost per section hour of laboratory activities amounts to $47, although the exclusion of the 4 more excentric units (CRI, GEO, HIS and INR) from the calculations brings it down to $34, a better estimate for most of the units. An analysis of the distribution of units from Table 12 shows 2 units for which costs of laboratories have remained low (ANT, ARC) although most of the

activities have been the responsibility of career faculty members. At least 18 units (55%) have cost figures for laboratory activities not much below or above the $34 average. In the intermediate or high cost categories fall criminology, geography, history, industrial relations, computer science and French. All units but history possess a high ratio of other activities to contact activities which increases the total cost of laboratories.

Average cost per section hour of clinical/internship activities ($9 per section hour) cannot easily be compared with the same measure for laboratories since section sizes between the two are quite different (Table 13). Comparing individual units, we observe that costs per section hour in clinical units such as dentistry, nursing, and pharmacy are below those observed in laboratory departments with similar group sizes. This clearly confirms that clinical activities need not be significantly more expensive to run than laboratory activities even when career faculty members are responsible for most of the teaching duties, such as in nursing. Among units with internship activities only, most fall at the low end of the scale with regard to cost per section hour. Their group sizes are close or equal to 1 and cost of external supervisors for all but two units (CRI, EDP) are zero. These factors contribute to keep the cost between 1 and 5 dollars a section hour which for many units (CRI, EDP, HEA, IND, INR, LAN, and URB) also amounts to the cost per student hour of internship activities.

Finally, the comparison of average costs per student hour for laboratory, clinical and internship activities respectively (2.7, 3.4, and 2.5 dollars per student hour), demonstrates that with the present organizational conditions, staff utilization patterns, and program structures, clinical/internship activities are not significantly more costly to run than laboratory activities once they are weighted by the number of student participants.

Relationships among Variables

For decision makers, the underlying objective of a study such as this is to uncover important and encompassing relationships among variables such as section sizes and costs of activities, which will allow them to classify units and programs according to some performance criteria. Findings from this analysis show that one cannot satisfactorily meet this expectation since most units display unique organizational patterns for their laboratory and clinical/internship activities, and that no simple causal relationships can be identified.

In comparing data on graphs, one finds that for most units with laboratory and clinical/internship activities, there is no relationship between supervision ratios and section sizes. Laboratory activities display a fairly homogeneous distribution of units with respect to section sizes, but supervision ratios vary widely. Half of the units with clinical/internship activities have section sizes equal or close to 1 and provide varying levels of supervision.

With respect to costs of activity, the three variables, section sizes, hours per credit and supervision ratios, do not relate with the variable cost per student credit hours for both laboratory and clinical/internship activities. The cost per section hour measure, however, is moderately responsive to changes in supervision ratios and in section sizes. It is a better overall indicator of cost.

Finally, one might have expected units with high career faculty member participation in laboratory and clinical/internship activities to incur costs well above average for those activities. This is not the case. With the exceptions of computer science, visual arts, French and criminology, for laboratory activities,

and of nursing and pharmacy for clinical/internship activities, the proportion of total costs attributed to career faculty members does not affect the cost per section hour of activity. Again, the particular preferences of units with respect to level of supervision, choice of personnel, and section sizes, interact in explaining variations in activity costs.

Conclusions

The objective of this paper was to present the methodology which has been used in this institution for the evaluation of laboratory and clinical/internship activities. The analysis has been focused primarily on the relationships among units with respect to variables of activities, staff time allocation and costs. For decision-making purposes, one would want to complement this study with a case-by-case evaluation of departmental activities to learn more about the particularities of programs and the diversity of organizational patterns.

Some conclusions to be drawn from this paper are the following:

1) In a system where clinical and internship activities are decentralized at the department level, one finds large gaps among units with respect to costs of activities; this is partially due to the units' abilities to negotiate teaching services and remuneration rates for professionals in the field supervising students. Thus as long as costs of supervision are maintained low, clinical and internship programs are very cost-effective learning tools.

2) Costs of laboratory activities vary widely among units, depending on the structure of activities, the intensity of supervision, and the category of teaching personnel responsible for the activities.

3) Some programs, mainly in the social science area, are much more costly to run than expected, because of activities not generally accounted in pricing formula; these activities are course preparation and organization, and individual student supervision and evaluation.

4) The cost per student credit hour ratio is a poor indicator of real cost since it does not account for the wide differences across departments and disciplines in the number of hours per course credit.

5) Career-faculty members' work loads are often systematically under- or over-estimated in survey results when compared to official departmental accreditation.

6) There are no common patterns of organization of laboratory and clinical/internship activities, which on the basis of disciplinary lines could be used to predict costs of activities.

TABLE 1

ANALYTICAL MATRIX

	Variables	Undergraduate Level	Graduate Level	Total or $\overline{X}$
Student Activities	Course credits	20	61	81
	Section size	8.2	1,0	4,2
	Scheduled course hours	916	2 332	3 248
	Section hours	10 335	9 682	20 017
	Section breakdown percentage	1 028%	315%	516%
	Total student hours	73 795	9 682	83 477
	Student credit hours	1 630	248	1 878
	Number of hours per credit	45	39	$\overline{X}$=44
Personnel Activities	Contact hours			
	Career faculty members	5 955	1 362	7 317
	Part-time instructors	-	-	-
	Teaching assistants	2 508	-	2 508
	External supervision personnel	-	-	-
	Total	8 463	1 362	9 825
	Contact hours + other hours			
	Career faculty members (CFM)	11 605	2 168	13 773
	Part-time instructors (PTI)	-	-	-
	Teaching assistants (TA)	2 508	-	2 508
	External supervision personnel (ESP)	-	-	-
	Total	14 113	2 168	16 281
Contact Ratios	CFM + PTI + TA			
	Per section	.82	.14	$\overline{X}$=.49
	Per student	.11	.14	$\overline{X}$=.12
	CFM + PTI + TA + ESP			
	Per section	.82	.14	$\overline{X}$=.49
	Per student	.11	.14	$\overline{X}$=.12
Costs	Amount paid to CFM	260 941	48 748	309 689
	Amount paid to PTI + TA	58 938	-	58 938
	Amount paid to ESP	-	-	-
	Total amount	319 879	48 748	368 627
	Cost per student credit hour	132	152	$\overline{X}$=134
	Cost per section hour	31	5	$\overline{X}$= 18
	Cost per student hour	4	5	$\overline{X}$= 4

Table 2

Undergraduate Departmental Teaching Activities According to Lecture Laboratory, Clinical/Internship Components

Academic Unit	Course Credits				Student Credit Hours			
	Lecture %	Laboratory %	Clinical & Internship %	Total	Lecture %	Laboratory %	Clinical & Internship %	Total
Anthropology	84	8	8	156	93	5	2	5 006
Architecture	42	39	19	221	49	48	3	6 934
Biology	67	33	-	203	74	26	-	11 878
Chemistry	66	34	-	141	71	29	-	5 512
Communication Sc.	88	12	-	60	83	17	-	2 478
Computer Sc.	70	30	-	180	71	29	-	10 777
Criminology	87	1	12	135	82	2	16	9 198
Dentistry	59	18	23	152	54	20	26	10 508
Educational Psychology	61	26	13	231	54	32	14	9 033
French	96	4	-	213	92	8	-	8 926
Geography	81	9	10	137	88	7	5	3 589
Geology	76	24	-	133	70	30	-	3 016
Health Serv. Admin.	66	-	34	44	94	-	6	2 994
History	96	4	-	198	89	11	-	6 966
Industrial Design	40	50	10	119	44	55	1	2 915
Industrial Relations	92	2	6	168	95	1	4	8 508
Landscape Archit.	50	45	5	129	56	42	2	2 712
Law	97	3	-	190	95	5	-	30 539
Mathematics	85	15	-	260	78	22	-	15 402
Music	60	40	-	283	46	54	-	9 792
Nursing	42	4	54	55	60	5	35	4 600
Nutrition	76	14	2[illegible]	132	68	15	17	5 143
Occ. & Phys. Therapy	68	16	16	128	69	17	14	6 271
Optometry	66	9	25	123	67	9	24	4 559
Pharmacy	77	18	5	129	83	13	4	11 611
Philosophy	98	2	-	123	95	5	-	4 119
Physical Education	56	36	8	227	71	24	5	10 436
Physics	89	11	-	144	88	12	-	4 992
Psychology	95	5	-	255	92	8	-	16 636
Social Work	76	-	24	98	76	-	24	5 052
Sociology	90	10	-	162	96	4	-	8 225
Speech & Hearing Ther.	78	12	10	82	77	14	9	1 977
Urban Planning	79	14	7	90	81	15	4	2 880
Veterinary Med.	63	15	22	215	68	18	14	12 285
Visual Arts	89	11	-	213	89	11	-	9 714

Table 3

Distribution of Units According to Cumulative Percentage of Laboratory and Clinical/Internship Course Credits				
percentage of departmental course credits				
less than 15%	15-25%	26-35%	36-45%	more than 45%
COM	ANT	BIO	DEN	ARC
CRI	GEO	CHM	EDP	IND
FRE	GLG	COS	VET	LAN
HIS	MAT	HEA	MUS	NUR
INR	PHA	NUT		
LAW	SOC	OPT		
PHI	SPE	OCC		
PHY	URB			
PSY				
VIS				
INCREASINGLY APPLIED PROGRAMS ⟶				

Table 4

Supervision Ratio, Section Size, Hours per Credit and Costs of Laboratory and Clinical/Internship Activities

Academic Unit	Laboratory Activities						Clinical/Internship Activities					
	staff contact hour / section hour	section size	hours per credit	cost per section hour $	cost per student hour $	cost per student credit hour $	staff contact hour / section hour	section size	hours per credit	cost per section hour $	cost per student hour $	cost per student credit hour $
Anthropology	0,15	9,6	38	5	0,5	19	0,15	2,3	42	7	3	20
Architecture	0,58	14,4	35	19	1,6	55	0,71	5,9	48	8	1	55
Biology	0,99	14,0	42	32	2,4	103	-	-	-	-	-	-
Chemistry	1,38	15,2	41	45	2,9	120	-	-	-	-	-	-
Communication Sc.	0,87	22,9	45	28	1,3	58	-	-	-	-	-	-
Computer Sc.	1,98	30,3	31	77	2,5	77	-	-	-	-	-	-
Criminology	2,71	11,4	12	149	13,1	160	0,24	1,4	44	3	2	65
Dentistry	1,02	11,7	30	30	2,7	81	0,84	3,4	45	23	7	328
Educational Psychology	1,14	15,2	15	35	2,3	34	0,09	1,1	59	3	3	163
French	0,62	19,9	15	61	3,1	30	-	-	-	-	-	-
Geography	1,98	19,3	20	129	7,2	143	-	-	-	-	-	-
Geology	1,05	13,0	45	26	2,2	97	-	-	-	-	-	-
Health Serv. Admin.	-	-	-	-	-	-	0,33	1,0	38	2	2	65
History	0,67	3,7	20	127	3,7	67	-	-	-	-	-	-
Industrial Design	0,72	16,3	41	26	1,6	74	0,05	1,0	60	1	1	52
Industrial Relations	1,00	31,8	16	136	4,3	70	0,04	1,0	45	1	1	39
Landscape Archit.	0,69	8,6	29	23	2,6	75	0,59	1,1	63	4	4	129
Law	1,00	24,0	36	21	0,8	31	-	-	-	-	-	-
Mathematics	3,94	28,6	24	50	1,7	42	-	-	-	-	-	-
Music	1,16	4,9	24	43	9,2	103	-	-	-	-	-	-
Nursing	0,99	21,4	30	23	1,1	33	1,06	8,2	45	31	4	132
Nutrition	0,77	13,0	32	42	3,2	102	1,55	6,2	66	18	3	136
Occ. & Phys. Therapy	1,20	18,5	26	36	2,0	51	1,92	1,8	55	1	1	37
Optometry	1,28	15,7	30	23	1,5	45	0,43	2,6	45	9	4	159
Pharmacy	0,88	16,0	44	30	1,9	42	1,05	9,0	45	28	3	141
Philosophy	1,00	17,0	15	46	2,7	41	-	-	-	-	-	-
Physical Education	1,05	18,8	30	28	1,3	40	1,35	5,5	40	4	1	23
Physics	1,09	10,8	45	30	2,8	127	-	-	-	-	-	-
Psychology	0,80	20,3	30	32	1,6	46	-	-	-	-	-	-
Social Work	-	-	-	-	-	-	0,38	1,2	45	7	5	185
Sociology	0,64	5,1	15	24	4,8	71	-	-	-	-	-	-
Speech & Hearing Ther.	0,80	15,9	37	31	1,8	65	0,13	1,2	48	1	1	62
Urban Planning	1,23	22,3	30	50	2,2	67	0,51	1,0	69	2	2	113
Veterinary Med.	1,93	38,3	28	59	1,6	44	0,67	3,5	45	15	4	177
Visual Arts	1,08	21,5	22	43	4,4	66	-	-	-	-	-	-

Table 5

Distribution of Units According to Supervision of Undergraduate Laboratory Activities					
staff contact hours/section hours					
less than 0,50	0,51-0,75	0,76-1,00	1,01-1,25	1,26-1,50	more than 1,50
ANT	ARC	BIO	DEN	CHM	COS
	FRE	COM	EDP	OCC	CRI
	HIS	INR	GLG	OPT	GEO
	IND	LAW	MUS		VET
	LAN	MAT	PHE		
		NUR	PHY		
		NUT	URB		
		PHA	VIS		
		PHI			
		PSY			
		SPE			

Table 6

Distribution of Units According to Supervision of Undergraduate Clinical/Internship Activities					
staff contact hours/section hours					
less than 0,50	0,51-0,75	0,76-1,00	1,01-1,25	1,26-1,50	more than 1,50
ANT	ARC	DEN	NUR	PHE	NUT
CRI	LAN		PHA		OCC
FRE	URB				
HEA	VET				
IND					
INR					
OPT					
SOC					
SPE					

Table 7

Staff Time Allocation for Laboratory, Clinical and Internship Activities - Undergraduate

Academic Unit	Laboratory Activities					Clinical/Internship Activities					
	Contact Hours %			Contact Hours / Total Staff Hours %	Staff Hours Total	Contact Hours %				Contact Hours / Total Staff Hours %	Staff Hours Total
	CFM	PTI	TA			CFM	PTI	TA	EXT. SUP.		
Anthropology	69	-	31	76	189	58	-	-	42	87	670
Architecture	94	4	-	76	7 402	20	37	-	43	79	1 595
Biology	30	4	66	76	12 915	-	-	-	-	-	-
Chemistry	34	2	64	72	8 207	-	-	-	-	-	-
Communication Sc.	-	42	58	61	1 187	-	-	-	-	-	-
Computer Sc.	38	9	53	33	18 625	-	-	-	-	-	-
Criminology	51	15	34	29	1 848	6	6	-	89	77	11 631
Dentistry	32	50	18	79	7 119	32	65	3	-	94	34 019
Educational Psychology	11	32	57	59	5 579	-	-	-	100	65	8 274
French	48	52	-	40	540	-	-	-	-	-	-
Geography	74	-	26	36	1 534	93	-	-	7	50	1 067
Geology	24	1	72	73	4 728	-	-	-	-	-	-
Health Serv. Admin.	-	-	-	-	-	8	-	-	92	29	7 140
History	-	-	100	72	3 735	-	-	-	-	-	-
Industrial Design	88	12	-	67	4 455	27	-	-	73	65	170
Industrial Relations	46	54	-	18	371	22	-	78	-	60	1 020
Landscape Archit.	70	16	14	68	3 805	17	-	-	83	82	1 977
Law	38	-	63	40	1 791	-	-	-	-	-	-
Mathematics	-	2	98	28	9 899	-	-	-	-	-	-
Music	30	54	16	95	15 280	-	-	-	-	-	-
Nursing	100	-	-	85	356	70	-	30	-	60	14 113
Nutrition	46	-	54	39	3 662	1	-	-	99	94	13 785
Occ. & Phys. Therapy	66	-	44	70	2 548	1	-	-	99	97	51 554
Optometry	63	4	33	80	858	21	78	1	-	98	8 487
Pharmacy	32	1	67	74	6 966	95	-	-	5	100	2 645
Philosophy	-	-	100	33	549	-	-	-	-	-	-
Physical Education	59	19	21	98	3 755	4	-	2	93	95	5 671
Physics	27	-	73	91	3 898	-	-	-	-	-	-
Psychology	67	11	22	44	3 538	-	-	-	-	-	-
Social Work	-	-	-	-	-	15	1	3	82	94	17 731
Sociology	100	-	-	76	765	-	-	-	-	-	-
Speech & Hearing Ther.	62	6	32	60	788	15	-	6	79	83	1 253
Urban Planning	65	-	35	53	1 395	4	-	-	96	85	4 900
Veterinary Med.	28	3	69	60	5 456	39	20	34	7	96	14 701
Visual Arts	31	59	10	49	4 584	-	-	-	-	-	-

Table 8

Percentage of Staff Contact Hours in Relation to Total Hours for Undergraduate Laboratory and Clinical/Internship Activities							
0-25%		26-50%		51-75%		76-100%	
Labor.	Clin./Intern.	Labor.	Clin./Intern.	Labor.	Clin./Intern.	Labor.	Clin./Intern.
INR	-	COS	HEA	CHM	IND	ANT	ANT
		CRI		COM	INR	ARC	ARC
		FRE		GLG	NUR	BIO	CRI
		GEO		HIS	EDP	DEN	DEN
		LAW		IND		MUS	LAN
		MAT		LAN		NUR	NUT
		NUT		PHA		OPT	OPT
		PHI		OCC		PHE	PHA
		PSY		EDP		PHY	PHE
		VIS		SPE		SOL	OCC
				URB			SOL
				VET			SPE
							URB
							VET

Table 9

Percentage of Teaching Assistant Contact Hours to Total Staff Contact Hours for Undergraduate Laboratory Activities			
0-25%	26-50%	51-75%	75-100%
ARC	ANT	BIO	HIS
DEN	CRI	CHM	MAT
FRE	GEO	COM	PHI
IND	OPT	COS	
INR	OCC	GLG	
LAN	SPE	LAW	
MUS	URB	NUT	
NUR		PHA	
PHE		PHY	
PSY		EDP	
SOL		VET	
VIS			

Table 10

Percentage of External Supervisor Contact Hours to Total Staff Contact Hours for Undergraduate Clinical/Internship Activities			
0-25%	26-50%	51-75%	75-100%
INR	ARC	SPE	LAN
NUR	ANT	DEN	SOC
PHA		IND	CRI
VET			URB
			PHE
			HEA
			NUT
			OCC
			OPT
			EDP

Table 11

Staff Cost for Laboratory, Clinical/Internship Activities - Undergraduate

Academic Unit	Laboratory Activities					Clinical/Internship Activities					
	Staff Cost %			Total Staff Cost	Direct Staff Cost / Total Cost	Staff Cost %				Total Staff Cost	Direct Staff Cost / Total Cost
	CFM	PTI	AUX.	$	%	CFM	PTI	AUX.	EXT. SUP.	$	%
Anthropology	90	-	10	4 448	72	100	-	-	-	10 707	87
Architecture	95	2	2	183 351	78	100	-	-	-	14 580	44
Biology	35	3	63	317 783	55	-	-	-	-	-	-
Chemistry	34	7	59	192 620	58	-	-	-	-	-	-
Communication Sc.	-	64	36	23 922	87	-	-	-	-	-	-
Computer Sc.	52	3	44	238 284	48	-	-	-	-	-	-
Criminology	73	18	8	29 199	47	37	24	-	38	93 098	78
Dentistry	40	49	11	168 051	87	38	60	1	-	886 674	94
Educational Psychology	22	52	26	102 184	87	-	-	-	100	208 127	65
French	33	67	-	21 342	40	-	-	-	-	-	-
Geography	77	-	23	36 016	37	100	-	-	-	27 699	50
Geology	55	3	42	87 545	75	-	-	-	-	-	-
Health Serv. Admin.	-	-	-	-	-	100	-	-	-	11 183	40
History	6	-	94	57 113	70	-	-	-	-	-	-
Industrial Design	95	5	-	106 929	68	100	-	-	-	2 343	33
Industrial Relations	53	37	10	8 859	29	68	-	32	-	14 739	57
Landscape Archit.	86	8	6	86 675	68	100	-	-	-	11 638	60
Law	37	-	63	41 944	33	-	-	-	-	-	-
Mathematics	12	7	81	144 863	26	-	-	-	-	-	-
Music	21	73	6	542 541	99	-	-	-	-	-	-
Nursing	100	-	-	8 005	85	82	18	-	-	319 879	60
Nutrition	70	-	30	77 963	35	10	-	-	90	149 756	89
Occ. & Phys. Therapy	86	-	14	53 477	72	100	-	-	-	32 165	15
Optometry	66	4	30	18 183	80	28	71	1	-	176 822	98
Pharmacy	46	3	52	121 818	75	96	-	-	4	70 894	97
Philosophy	15	-	85	8 285	28	-	-	-	-	-	-
Physical Education	54	36	10	99 497	99	72	28	-	-	16 179	58
Physics	61	-	39	75 109	61	-	-	-	-	-	-
Psychology	54	13	32	62 199	68	-	-	-	-	-	-
Social Work	-	-	-	-	-	33	2	2	63	287 973	90
Sociology	100	-	-	21 275	76	-	-	-	-	-	-
Speech & Hearing Ther.	82	8	10	18 046	61	84	-	8	8	11 625	51
Urban Planning	83	-	17	30 029	58	100	-	-	-	16 923	23
Veterinary Med.	49	5	46	99 596	59	69	11	20	-	315 527	78
Visual Arts	49	39	12	102 668	69	-	-	-	-	-	-

Table 12

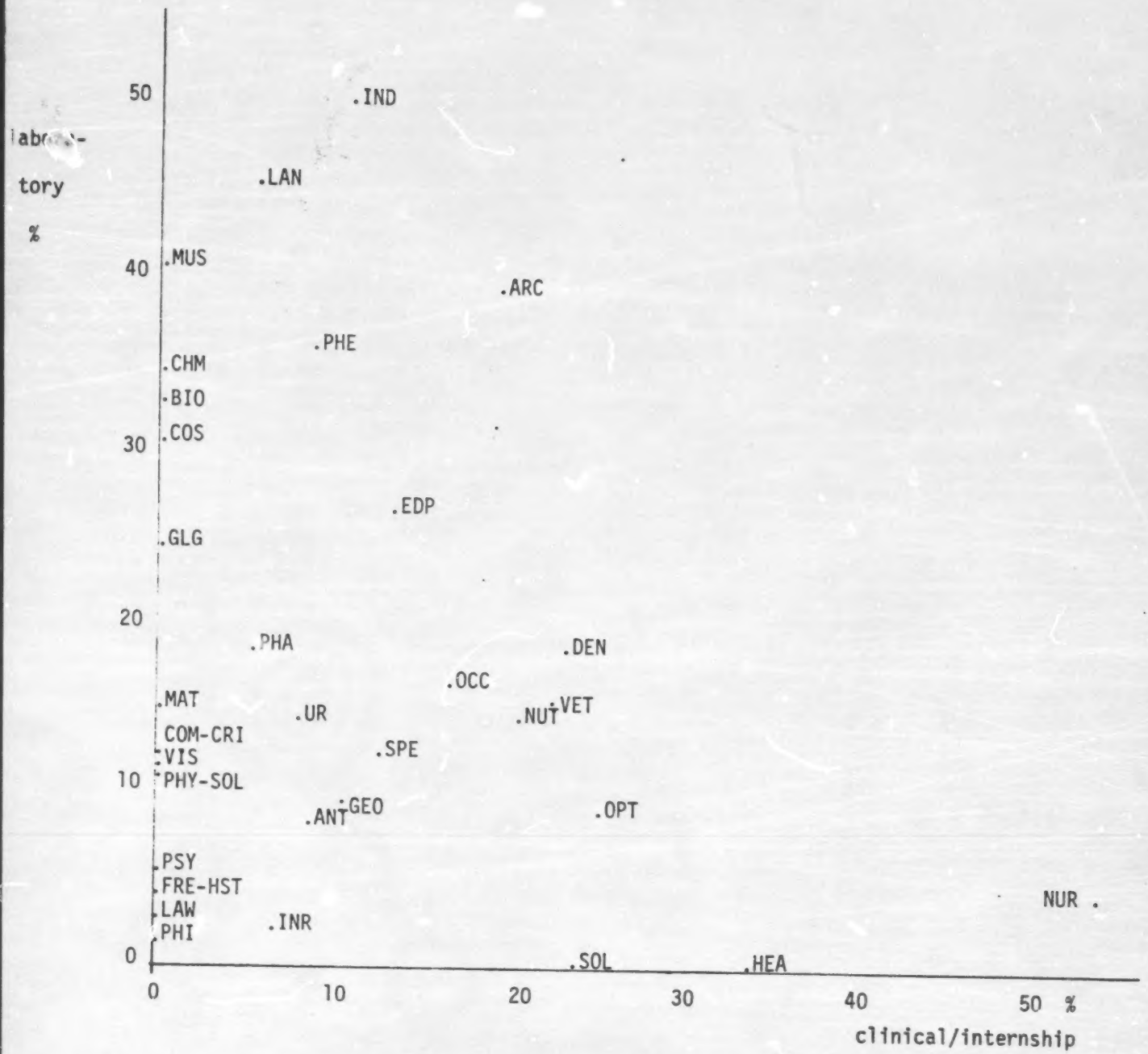
Distribution of Units According to Undergraduate Laboratory Costs per Section Hour					
total staff costs/section hours ($)					
less than 20	21-40	41-60	61-80	80-100	more than 100
ANT	BIO	MAT	COS	-	CRI
ARC	CHM	MUS	FRE		GEO
	COM	NUT			HIS
	DEN	PHI			INR
	EDP	URB			
	GLG	VET			
	IND	VIS			
	LAN				
	LAW				
	NUR				
	OCC				
	OPT				
	PHA				
	PHE				
	PHY				
	PSY				
	SOL				
	SPE				

Table 13

Distribution of Units According to Undergraduate Clinical and Internship Costs per Section Hour				
total staff costs/section hours ($)				
0-5	6-10	11-15	16-20	more than 20
CRI	ANT	VET	NUT	DEN
EDP	ARC			NUR
HEA	OPT			PHA
IND	SOC			
INR				
LAN				
OCC				
PHE				
SPE				
URB				

FIGURE 1

LABORATORY AND CLINICAL / INTERNSHIP COURSE CREDITS AS PERCENTAGE OF UNDERGRADUATE DEPARTMENTAL COURSE CREDIT OFFERINGS



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